



Warmer temperatures reduce the vectorial capacity of malaria mosquitoes

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Year: 2012
Journal: Biology Letters. 8 (3): 465-468

Abstract:

The development rate of parasites and pathogens within vectors typically increases with temperature. Accordingly, transmission intensity is generally assumed to be higher under warmer conditions. However, development is only one component of parasite/pathogen life history and there has been little research exploring the temperature sensitivity of other traits that contribute to transmission intensity. Here, using a rodent malaria, we show that vector competence (the maximum proportion of infectious mosquitoes, which implicitly includes parasite survival across the incubation period) tails off at higher temperatures, even though parasite development rate increases. We also show that the standard measure of the parasite incubation period (i.e. time until the first mosquitoes within a cohort become infectious following an infected blood-meal) is incomplete because parasite development follows a cumulative distribution, which itself varies with temperature. Including these effects in a simple model dramatically alters estimates of transmission intensity and reduces the optimum temperature for transmission. These results highlight the need to understand the interactive effects of environmental temperature on multiple host-disease life-history traits and challenge the assumptions of many current disease models that ignore this complexity.

Source: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3367745>

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

Climate Change and Human Health Literature Portal

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Mitigation/Adaptation: 

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type: 

format or standard characteristic of resource

Research Article

Timescale: 

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: 

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content